REMARKS

This paper is in response to the Office Action dated December 26, 2008. Applicant has amended the application as set forth above. No new matter is added by the amendments as discussed below. Applicant respectfully requests the entry of the amendments and reconsideration of the application in view of the above amendments and the following remarks.

Discussion of Amendments

Support for the amendments to Claims 1 and 5-8 can be found in, for example, Figures 4 and 5, and paragraphs 34-50 of the specification. Claims 2 and 9 have been cancelled without prejudice. Support for new Claims 10-14 can be found in, for example, Figures 4 and 5, and paragraphs 34-50 of the specification.

As such, Applicant respectfully submits that the amendments are fully supported by the application as originally filed and do not constitute the addition of new matter. Applicant respectfully requests the entry of the amendments.

Discussion of Rejection Under 35 U.S.C. § 102

The Office Action rejected Claims 1, 2 and 9 under 35 U.S.C. § 102 (b) as being anticipated by Leszcynski (U.S. Patent No. 5,157,639). Applicant respectfully disagrees with the Examiner. Solely to expedite the prosecution of the application, however, Applicant has amended Claim 1 and cancelled Claims 2 and 9 without prejudice. Thus, the rejection of Claims 2 and 9 is moot. Applicant respectfully submits that Leszcynski does not anticipate Claim 1 as discussed below.

Leszcynski Does Not Anticipate Claim 1

Claim 1 is directed to a method of determining a distance between objects. The method of Claim 1 comprises:

transmitting, from a transmitter, an ultrasonic signal having a specific frequency component maintained for a predetermined period;

receiving, at a receiver distanced from the transmitter, the ultrasonic signal;

amplifying the received ultrasonic signal to generate an amplified signal;

filtering the amplified signal to generate a filtered signal in which an unnecessary frequency of the amplified signal is removed or weakened;

converting the filtered signal into a digital signal;

extracting a portion of the converted digital signal that reflects the specific frequency component maintained for the predetermined period;

analyzing the extracted portion to determine an arrival time of the ultrasonic signal, using the frequency component; and

determining a distance between the transmitter and the receiver, using the arrival time.

Leszcynski discloses ultrasonic detectors that are used to determine the level of liquid contained in a tank or the magnitude of flow within a conduit. *See* Leszcynski, Col. 1, lines 5-8. Leszcynski's ultrasonic detectors emit bursts of ultrasonic energy and respond to echoes of the bursts that are reflected from surfaces of the tank or conduit. *See id.* at Col. 1, lines 10-15. Leszcynski also teaches determining the time of arrival of echoes using the first received echo or the echo having the largest magnitude. *See id.* at Col. 4, lines 13-18. Leszcynski further teaches distinguishing true echoes from spurious echoes based on the frequency of the echo signal. *See id.* at Col. 8, line 60-Col. 9, line 5.

In Leszcynski, the detector itself emits the ultrasonic bursts and also detects echoes for determining the arrival time of echoes. As such, Leszcynski does not teach the claim feature of "receiving, ***at a receiver distanced from the transmitter***, the ultrasonic signal." Further, for the same reason, Leszcynski does not teach the claim feature of "determining a distance between the transmitter and the receiver."

Furthermore, Leszcynski does not disclose the claimed features of "transmitting, from a transmitter, an ultrasonic signal having a specific frequency component maintained for a predetermined period," and "extracting a portion of the converted digital signal that reflects the specific frequency component maintained for the predetermined period."

As Leszcynski does not disclose every element of Claim 1, the reference does not anticipate Claim 1. Applicant respectfully requests that the anticipation rejection be withdrawn.

Discussion of Rejection Under 35 U.S.C. § 103

The Office Action rejected Claims 1 and 5-8 under 35 U.S.C. § 103 (a) as being unpatentable over Hayashi (U.S. Patent Application No. 2004/0021566 A1) in view of Leszcynski. Applicant respectfully disagrees with the Examiner. Solely to expedite the prosecution of the application, however, Applicant has amended Claims 1 and 5-8. Applicant respectfully submits that these claims are patentable over the cited references as set forth below.

Claim 1 and 5 Are Patentable over the Cited References

As admitted in the Office Action at page 4, lines 3-4, **Hayashi** fails to teach the signal processing features recited in Claim 1. The Office Action, however, asserted at page 4, lines 4-5 that Leszcynski teaches the signal processing.

However, as discussed in the anticipation rejection, **Leszcynski** fails to teach the claim features of "transmitting an ultrasonic signal having a specific frequency component maintained for a predetermined period;" "receiving, at a receiver distanced from the transmitter, the ultrasonic signal;" "extracting a portion of the converted digital signal that reflects the specific frequency component maintained for the predetermined period;" and "determining a distance between the transmitter and the receiver."

Further, to the best knowledge of Applicant, there is no additional reference or non-reference prior art to remedy the deficiencies of Hayashi and Leszcynski. Therefore, the Office Action does not meet ***the need to demonstrate the presence of all claim limitations in the prior art***. *See Abbott Labs. v. Sandoz, Inc.*, 2007 WL 1549498, *4 (N.D. Ill. May 24, 2007). Thus, Claim 1 is patentable over the cited references, and Claim 5 depending from Claim 1 is also patentable over the references for at least the same reasons.

Claim 6 Are Patentable over the Cited References

Claim 6 is directed to a method of determining a distance between objects. The method of Claim 6 comprises:

transmitting, from a transmitter, an ultrasonic signal having a specific frequency component maintained for a predetermined period;

receiving the ultrasonic signal by a first receiver at a known distance from the transmitter;

determining a first arrival time of the ultrasonic signal at the first receiver;

receiving the ultrasonic signal by a second receiver at an unknown distance from the transmitter;

determining a second arrival time of the ultrasonic signal at the second receiver;

determining a speed of propagation of the ultrasonic signal using the first arrival time and the known distance; and

determining the unknown distance between the transmitter and the second receiver, using the second arrival time and the speed of propagation of the ultrasonic signal,

wherein determining the first arrival time of the ultrasonic signal received by the first receiver comprises:

amplifying the received ultrasonic signal to generate an amplified signal;

filtering the amplified signal to generate a filtered signal in which an unnecessary frequency of the amplified signal is removed or weakened;

converting the filtered signal into a digital signal;

extracting a portion of the converted digital signal, the extracted portion reflecting the specific frequency component maintained for the predetermined period; and

analyzing the extracted portion to determine the first arrival time.

As admitted in the Office Action at page 4, lines 3-4, **Hayashi** fails to teach the specific signal processing recited in Claim 6. The Office Action, however, asserted at page 4, lines 4-5 that Leszcynski teaches the signal processing.

However, as discussed above, **Leszcynski**, does not teach claim features of "transmitting an ultrasonic signal having a specific frequency component maintained for a predetermined period;" "receiving, at a receiver distanced from the transmitter, the ultrasonic signal;" "extracting a portion of the converted digital signal that reflects the specific frequency component maintained for the predetermined period;" and "determining a distance between the transmitter and the receiver."

In view of the foregoing, Leszcynski and Hayashi in combination or alone fail to teach

every feature of Claim 6. As such, these references cannot establish a *prima facie* case of obviousness.

Further, to the best knowledge of Applicant, there is no additional reference or non-reference prior art to remedy the deficiencies of Hayashi and Leszcynski. Therefore, the Office Action does not meet ***the need to demonstrate the presence of all claim limitations in the prior art***. *See Abbott Labs. v. Sandoz, Inc.*, 2007 WL 1549498, *4 (N.D. Ill. May 24, 2007). Thus, Claim 6 is patentable over the cited references.

Claim 7 Are Patentable over the Cited References

Claim 7 is directed to a device for determining a distance using an ultrasonic signal. The device of Claim 7 comprises:

a transmitter configured to generate and transmit an ultrasonic signal having a specific frequency component maintained for a predetermined period;

a sensor distanced from the transmitter and configured to receive the ultrasonic signal transmitted from the transmitter;

an amplifier configured to amplify the ultrasonic signal received by the sensor;

an analog filter configured to select the specific frequency component from the ultrasonic signal amplified by the amplifier, thereby generating an analog-filtered signal;

an A/D converter configured to convert the analog-filtered signal to a digital data;

a memory configured to store the digital data therein; and

a digital signal processor configured to process the digital data stored in the memory to extract a portion reflecting the specific frequency component maintained for the predetermined period,

wherein the digital signal processor is further configured to analyze the extracted portion to determine an arrival time of the ultrasonic signal, and

wherein the digital signal processor is further configured to determine a distance between the transmitter and the sensor, using the arrival time.

As admitted in the Office Action at page 5, lines 1-2, Hayashi fails to teach the details of amplifying and filtering of the signal. The Office Action, however, asserted at page 5, lines 2-3 that Leszcynski teaches the signal processing.

However, as discussed above, **Leszcynski**, does not teach claim features of "a transmitter configured to generate and transmit an ultrasonic signal having a specific frequency component maintained for a predetermined period;" "a sensor distanced from the transmitter and configured to receive the ultrasonic signal transmitted from the transmitter;" and "a digital signal processor configured to process the digital data stored in the memory to extract a portion reflecting the specific frequency component maintained for the predetermined period." Leszcynski also fails to teach that "the digital signal processor is further configured to determine a distance between the transmitter and the sensor, using the arrival time."

In view of the foregoing, Leszcynski and Hayashi in combination or alone fail to teach every feature of Claim 7. As such, these references cannot establish a *prima facie* case of obviousness.

Further, to the best knowledge of Applicant, there is no additional reference or non-reference prior art to remedy the deficiencies of Hayashi and Leszcynski. Therefore, the Office Action does not meet ***the need to demonstrate the presence of all claim limitations in the prior art***. *See Abbott Labs. v. Sandoz, Inc.*, 2007 WL 1549498, *4 (N.D. Ill. May 24, 2007). Thus, Claim 7 and its dependent Claim 8 are patentable over the cited references.

Dependent Claims and New Claims

Although Applicant has not addressed all the issues of the dependent claims, Applicant respectfully submits that Applicant does not necessarily agree with the characterization and assessments of the dependent claims made by the Examiner, and Applicant believes that each claim is patentable on its own merits. Applicant respectfully submits that pursuant to 35 U.S.C. § 112, ¶4, the dependent claims incorporate by reference all the limitations of the claim to which they refer and include their own patentable features, and are therefore in condition for allowance. Therefore, Applicant respectfully requests the withdrawal of all claim rejections and prompts allowance of the claims.

In addition, new Claims 10-14 depend from Claim 1, and thus are patentable for at least the same reasons discussed above. Therefore, Applicant respectfully requests prompt allowance of the new claims.

No Disclaimers or Disavowals

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, Applicant is not conceding in this application that previously pending claims are not patentable over the cited references. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that Applicant has made any disclaimers or disavowals of any subject matter supported by the present application.

CONCLUSION

Applicant has endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. Accordingly, arguments in support of the patentability of the pending claim set are presented above. In light of the above remarks, reconsideration and withdrawal of the outstanding rejections is respectfully requested. If the Examiner has any questions which may be answered by telephone, he is invited to call the undersigned directly.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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